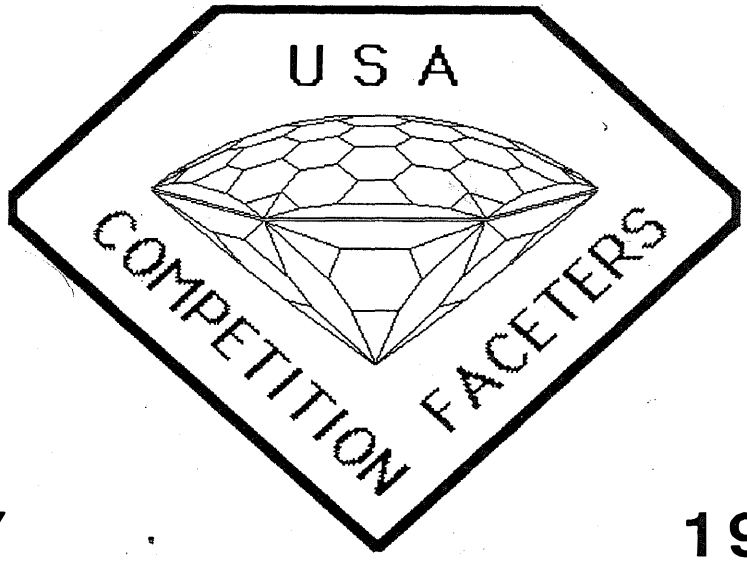
USACF NEWSLETTER



MAY **1992**

USACF NEWSLETTER
25267 PINEVIEW DR.
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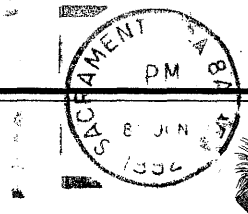

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Vol. 2 **No. 2**

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POLISHING IS THE FOCUS OF THIS SECOND ISSUE OF 1992. I HOPE YOU WILL FIND SOMETHING NEW IN THESE ARTICLES–ED.

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To assist Bill Norton on Rules and Competition, Norman Steel, Pres., has appointed Fred Van Sant and Walter Carss, subject to confirmation by the board at the next board meeting.

The USACF Newsletter is a quarterly publication of the USA Competition Faceters.

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Address Corrections:

Walter Carss--see officer list.
Larry & Barbara Green--see same list.

Meeting in Bend

After the last speaker at the NW Conference all the members of USACF who were present met to discuss hosting the Australian Cup Challenge in 1994. Present were Norman Steele, Paul Billett, Fred Van Sant, Charles Hettich, John Alden, Vern Johnson, Larry and Barbara Green, Charles Moon, and Russ Wight.

Several problems connected to our hosting the competition were discussed. The first was financial—we don't have the funds and are not even sure we can raise them. We have 22 members this year. The AFG has 1200 members and they have problems with funding. The second problem was Rules. Some of us were strongly for using our own rules if we hosted, but those who were in Australia recently were so sure the Australians would not accept our using our rules that the discussion turned to just what was the Cup Challenge ? All agreed that it is strictly an Australian contest, and sentiment around the table was for a truly International Contest held under a set of International Rules. But we don't have time to do all the negotiating and planning for such a contest in time for the 1994 competition. In the face of such huge obstacles it was decided that the USACF should not attempt to host the 1994 Challenge, but a letter should go out to our members for their review.

AVAILABLE NOW--Star Cuts 4, designs 181 through 240 plus pictorial table of contents, in the form of 64 sheets (8 1/2 by 11) printed single-side and punched for standard 3-hole binder. Send a personal check or money order to Fred W. Van Sant, 25267 Pineview Dr., Colfax, CA, 95713. The price, which includes postage, is $7.00
NO MAILING OUTSIDE THE U.S.A.
Star Cuts 1,2, and 3 are also available as above.

Letter From Our President

by Fred Van Sant

I was saving this space to include a letter to all members from Norm Steele, but since he has elected to send the letter out separately, I would like to summarize some points brought out both in Norm's letter and at the N.W. Conference.

1) Selection of team. Every country who has a team should have the right to select their own team members who will be representing them.
2) Judging should not be done in secret.
3) Judges should be from several of the countries sending a team, not just one.
4) The final judging should be on only those stones cut by members of the country's team, or individual entrants stones if there are not enough cutters to make up a team.
5) Rules should be International Rules, worked out and voted on by members of any country that wishes to furnish a team.
6) To prevent re-occurance of such problems as those we had with the 2-16 Square Cushion, designs selected must be computer checked before issuance.

The NW Faceters Conference

by Fred Van Sant

At 4000 feet elevation, the Riverhouse Inn lies on both sides of the Deschutes River, connected by a long covered footbridge. This was a good place to meet and talk with old friends and make new ones. Those with motor homes and trailers congregated at the KOA Campgrounds one-half mile north of town.

One Faceter who we hadn't seen for several years showed up--Cliff Hiner. Cliff and his wife have been traveling around the country in their motor home. Cliff used to host the Pegboarders meetings over in Vallejo, Calif. many years ago.

Cliff Jackson did not attend, but Gary Peterson and Ed Romak were there, and they helped me understand a little more about what led up to the problems in making changes in the AFMS Rules in the area of faceting competitions. My current impression is that really nobody was at fault, but the time frame set for work to be accomplished was too small, and some things were squeezed out in order to meet deadlines. We amateurs working unpaid should not be expected to meet the standards of company employees in high-pressure circumstances--so we should be careful not to transfer our work expectations to hobby members, many who are retired and have a more relaxed pace.

I attended only a few of the program lectures, and did not find much new. Robert Strickland gave a good demo of his GemCAD program. He is a very personable young man, and I hope he has a long future in the computing side of the gem hobby.

Strange Things Down Under

by FVS

Besides Kiwis, Kangaroos, and Platypusses, the Australians have other strange things bewildering to us Yankies. In the Australian Rules the judge is instructed, in judging "Visual Effect", to make an estimate of the area of the stone which is reflecting light back to the eye. "The light that is not being reflected back will be represented by the presence of a 'fisheye' or 'dark ring'. The area that displays either of these features is assessed and the equivalent percentage of points deducted from the points allocated for this feature".

Assuming the judge is using identical lighting for all the stones he judges, the dark areas of the stone seen, as the judge is instructed to view the stone, are mainly a function of the design itself. The cutter is to be penalized for something the designer did. And since no stone returns all the light entering it, even if the cutter cuts an absolutely perfect stone he still cannot get a score of 100. Or can he ?

The SPOT lighting model now used by Long & Steele gives a fair approximation of the conditions under which the judge is to view the stone. The brightness patterns indicate that the dark areas of the stone obtained are a function of the design itself. If a design shows a 70% Brightness, and the judge accurately deducts points as directed, then for such a design the maximum score for Visual Effect should not be more than 70% of 6, or 4.2

Also under Section 10, i, JUDGING TECHNIQUES, it states "Polish refers to the quality of light that is reflected back from the surface." In physics I learned that light qualities can be defined as intensity, magnitude, wave-length, luminescence, etc., but I don't think these are what the Australians have in mind. Since the phrase "quality of light" is not defined it is anyone's guess what it means. At the end of this same paragraph it states "To check the quality of the polish ensure that the surface that you are looking at is not reflecting the light back to your eye, as this will give you a false picture." (underlines mine-Ed.)

You are to judge the quality of light reflecting back to your eye while at the same time making sure that light is not reflecting back to your eye ! How do they do that ???

Australian Faceters Guild
Judging Course — April 21,1992
by Marian Alden

Americans attending the Cup Challenge were invited by the Australian Faceters Guild to participate in their 3-day training course for judges. This course is required for judges in Australia, and normally costs the Australians who take it $20, in addition to all their equipment. For us they refused to charge any fees at all, and also fed the group very nicely at tea times and for lunch. Everything was homemade and delicious.

Those attending were Col. Walter Carss—AFMS Judge, Hugh Rackets—also AFMS Judge, Norman Steele—AFMS Judge, Dr. Jean Marr, Don Dunn, and John Alden.

The judging school teaches the methods used for judging—what to look for and how to see it during the judging process. They learn how to detect out-of-class entries. Judges judge independently, and put their scores on the score sheets, but may not add up the scores. The Competition Committee is in charge of totalling up the scores, deciding out-of-class entries, and other issues. Tied scores remain a tie, there is no tie-breaking.

The training judge was Jennifer King, who has worked very hard on the Committee for Rules and Judging Nationally. She also was a teacher for the Australian Gemology Association, which is similar to our own GIA. The following were her opening remarks: "First let me tell you that I recognize that most of the stones we judge will be those from beginners, and that they facet gems for fun and not as a business. We therefor have no wish to be extremely hard on them. However we consider the judging of stones one way of training the amateur in correct methods, and the results they should look for. By making the judging standardized, those in the Outback as well as those in the cities can learn from this judging process. All stones are judged, even those that are out-of-class. Those in remote areas, by mailing stones in to us for competitions, get the education they might otherwise miss—our judging takes the place of training programs they have no access to. We do have some seminars, but it is still difficult to reach all faceters.

We are here primarily for the beginner. Most of the stones we will be judging will be from beginners who need our help. We feel that too many teachers ask first-time cutters to cut a Round Brilliant, and often out of quartz. We feel that is a very difficult cut for beginners, so we use a simpler cut. Beginners need the kind of cuts they can feel successful in cutting. Furthermore, quartz is one of the harder materials to polish.

Some judges are tougher than others. When we teach you to judge we do not tell you how strict you should be. We have a graduated point system, but not for all errors. Some errors simply earn a whole point discount; a meet, for example, is a meet or it is not a meet. If it does not meet completely a whole point is deducted. I like to work on a one-to-one basis to show our method, so when we start judging I will see each of you personally to show you some of the techniques we use."

(end of rough quotes)

These opening statements were an eye-opener to me. During the sessions each of the USA fellows and one lady—Jean Marr—learned some techniques they all were very surprised to learn. None of the judging is done with anything other than 10X power hand held magnifiers.

Two whole days were devoted to judging stones. I asked Jenny how they set this all up. One hundred stones are collected from members of all abilities. Because things do happen during the judging process, stones are rejudged prior to every training session. Each trainee has approximately 15 stones to judge over the 2+ day period. They allow for those who may be faster or slower. The trainee's sheet is compared to one done by an Australian judge. Jenny says, "We look for consistency, not a duplication of the judges scores."

AFG Seminar, September 19—20

"We virtually eat, drink, and sleep faceting for the weekend, and they even arrive early and start informally around Thursday !

It is the one opportunity in Australia to get around 300 facetors together so they can swap ideas, problems, and renew friendships.

There is on-campus accommodation available at Scot PGC College, the seminar venue, to those who don't have their own transport and want to stay where the action is.

We run the seminar on a 'hands-on' rather than lecture room basis and usually conduct sessions in three strands so attendees are able to select their own program to cover their particular needs and interests.

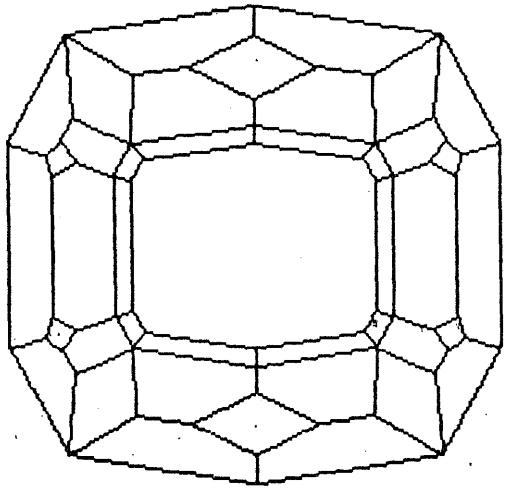
September is our Spring, and is a good time to start heading for the sapphire fields of Central Queensland and northern New South Wales, and of course the opal fields

Anyone wanting more information about the seminar can contact me."

Yours in Faceting,
Peter Collins,
P.O. Box 399, Warwick, Qld. 4370, Australia
(from Facet Talk)

GENERIC DESIGNS

In the last issue I promised to give you a computed version of the Infinity Cut. I did compute the crown, shown below, but then realized that it does not have to be computed. It doesn't really matter if the L/W is something else, or if the corners are at a different index, or if the angles of the steps are different. You simply cut three steps, and then overcut the points between steps 1 and 2. Many faceters ignore angles given for step cuts and use their own favorite angles anyhow.



Somewhere between Improvised Cuts and Fully Defined Cuts lie the **Generic Cuts**, designs which may or may not be fully defined but don't really **need** to be. They are generalized patterns. Two such patterns are the Step Cuts and the Step Cuts with overcut points. There may be others. It is fairly easy to improvise a cut like the Infinity, and everyone should do it at least once. This type of cut would be good for a special single-stone competition where cutters have to cut the general pattern to a given L/W ratio and number of steps, using their own angles to achieve the maximum brightness. — FVS.

USACF CASE STONES

Have you sent in your two stones to Bill Norton yet for the USACF case ? Check back to the previous issue for information. Don't put this off any longer or we won't have a case to display at the CFMS show in Sept. If we are ever going to host an international competition we must build up USACF membership and funds, and the case is one way to advertise our group.

Much Ado About Nothing

Is a glass half full or half empty ? One comedian said, "Neither, the glass is too big."

Within the past year I have received or heard remarks to the effect that judges should approach judging with a positive attitude, and award points for a stone well cut instead of focusing on the errors made.

This position is taken mostly by old-time faceters. Perhaps way back stones were so poorly cut that the bad points outweighed the good and it was more practical to count up the good points. I have yet to see any final scores that were not given as positive numbers. The tallying up of errors is done because it's more practical, not because we have negative attitudes or want to punish anybody. It is a tribute to the ability of cutters that the good points so far outweigh the bad that it is far easier and simpler to count up the errors and subtract from a set total. If you don't believe this, try setting up a judging system which states exactly how to score such qualities as pitlessness and scratchlessness. You will find that it is quite complicated, and that you have to pay positive attention to the size of pits and scratches anyhow. --- FVS

MEMBERSHIP

This year we have fewer members than we had last year. This isn't something we can just leave up to Marian Alden, our membership chairman; we all have to work on increasing our membership. Let's everyone try to bring in at least one other new member. Point out to the new member that he is helping the hobby by joining. We are not spending any funds for food at the meetings of our officers. We are saving up for hosting an international competition, and for working toward a truly international set of rules for such a competition. This should benefit everyone, not just members of USACF; but of course we back those American cutters who do participate in the Australian Cup competition also. Every penny of our dues goes for worthy causes. --- FVS

PREFORMING: What's The Best Way ?

by Fred Van Sant

With the new bells and whistles added onto faceting machines in recent years, preforming options have expanded. It used to be that when you cut an octagon shape you always started with the dop arm at 90° and cut 8 facets using a positive stop (Method 1). You cut each one until no sound could be heard between the stone and the lap. It took a long time for each facet.

Now with digital readouts, contact switches that turn on a light when the facet has reached the proper depth of cut, and better positive stops, we should take a second look at our options and ask ourselves, "Could I be doing it a different way that might be better ?"

But what is better ? Certainly a more accurate shape is better, and certainly making a preform of the same accuracy in a shorter time is better. One could also throw in the consideration of safety--one method may be less inducive to making errors than another. But accuracy and speed is probably the best answer. So it depends largely on what the cut stone is for. If it's a commercial stone speed may take precedence, but if it's a competition stone accuracy will be most important.

The advantage of making eight girdle facets at 90° is that it is a one-step process. But it is slow, and to be sure your preform is accurate you have to measure the relative lengths of the girdle facets made. Also you have to cut close to the edge of the lap, where any wobble in the lap is magnified. Another limitation is that you must cut the pavilion starting at the girdle. There is a distinct possibility that your culet point will not end up in the exact center of the dop axis. This method is limited to only those shapes which can be preformed at a single mast-height setting. (ED. NOTE: From a historical point of interest, R. Long and N. Steele once proposed the Mast Height Adjustment, or MHA, method of making a preform. This method, while possible, did not prove practical, and was superceded by next method described below, the Centerpoint Angle Method).

Method 2, the C.A.M. (Centerpoint Angle Method), is a two-step process--you cut a set of facets at the same indices as your girdle facets, at predetermined angles, to make a temporary culet point, then at 90° make a second set of facets (girdle facets) all around the stone to make a level line. It can be used to preform <u>any</u> shape. The accuracy of this method depends on how close you can cut to the given angles. If the CAM facets do not come to a perfect point, then what ? Do you juggle ?, lower the mast a hair and recut ? When you have the point made, how do you know it is in the exact center of the dop arm axis ? This last question is answered in the article "CAM Preform--The Cone" in the previous issue. The centering of the temporary culet point makes it possible on rounds to cut a set of facets without adjusting the mast height. You <u>can</u> cut a round brilliant type stone with the culet point off-center, but you will have to adjust the cutting angle for every facet in every set.

The CAM preform is being used more frequently in recent years. Originally popularized by Long and Steele for making odd-shaped preforms, some cutters prefer it even for round designs because it is faster, and because it is possible to be sure the culet point is centered. Once the shape is made the pavilion can be cut from the girdle to culet, or if the CAM angles are computed using the Zero Vertical Loss Method, as given on my own designs, the pavilion can also be cut starting at the culet. The Zero Vertical Loss Method is a method of computing a set of CAM angles such that the true pavilion angles can be cut using the culet made by the CAM preform as the permanent culet. The lowest-angled true pavilion facet's lines will coincide with the face of the CAM facet which it cuts into.

The other popular preforming method is Meetpoint. Here again you must start with a culet point which usually must be centered, so starting with a cone culet is a good option. The disadvantage of any method which starts from the culet is that the stone shape is the result of a series of meets, and it is more possible to get an accumulation of small errors which affect the girdle outline. The advantage is that many non-symmetrical shapes can be cut with a fairly high degree of repeatability.

As you can see by now, the preform method you use is determined sometimes by the design, sometimes by the use to which the finished stone will be put, and by the capabilities of your machine.

Let's discus competition stones. Where you do have a preform choice, you should choose the one which gives greatest accuracy. This is determined by your machine's capabilities. If you can't read your protractor to at least an accurate tenth of a degree, or if your positive angle stop allows too much flexibility, then if you're cutting an ECED design you should stick to the old one-step direct girdle at 90°. But if you have a tight, well-calibrated machine, you might try a comparison check between the old method and one or two of the others. Use the same material--glass will do--and cut two or three preforms the same pattern and same size. Time yourself. See how long it takes to finish a preform for each method. Then appraise the finished preforms. The results might surprise you.

On Laps and Polishing

by Charles Hettich

One should have 260, 600, and possibly 1200 grit laps, just to get the stone cut to the stage that it is ready for what I call the "PPP" or Pre-Polish Preparation. The PPP is what "separates the men from the boys". The pre-polish lap that I recommend very strongly is a Fast Lap (Raytech) or a Last Lap (Crystalite) sprayed with 8000 mesh diamond. Use this combination to recut the stone, and leave the "grooves of the lap". This is something I can't explain; you'll just have to see it for yourself. Then when you go to polish, you just polish the grooves out. Before you polish, make sure that the stone, dop, lap, and quill are clean, and don't forget your hands. We don't want any 8000 grit falling on your polishing lap.

As far as polishing laps are concerned, I believe I have tried the whole gamut. First of all, I believe that ceramic laps are a nightmare and a farce. I have tried every new technique that has been suggested to get them to work and I find them impossible to use. I don't recommend them to a novice or advanced faceter. They are simply not worth the money.

As for other polishing laps, a lot depends on what you're going to use the laps with. I'm a confirmed diamond polisher. I polish everything with diamond. I do not use the slurries. A good polishing lap is the Fast or Last Lap, but a word of warning: These laps run HOT! As you are polishing, unless you're careful, the stone will move on your dop.

The tin lap is probably the most vital lap that you can own. The tin lap can be used to polish almost everything. The exception would be corundum, and for that I'd recommend a zinc lap because it's a bit harder. But 99% of your polishing is done on a well-scored tin lap.

I'm a firm believer in scoring, even though the manufacturers advise against it. I'm working on a future article on scoring--why I think it works and how to do it properly.

I own four tin laps PLUS the address of a good machine shop. The reason I own four laps is because after a while the laps will begin to wear or get cranky. When I accumulate two laps that are worn or cranky, I take them to the machine shop to get them resurfaced. That way I always have two laps to work with. The machine shop just takes a little bit of metal off the surface to true them up.

One easy way to true up a lap and score it at the same time is to go to your local glass shop and get a 3/8" or thicker piece of glass over 12 inches square. The thicker the glass the flatter it is. Now get a piece of 8 X 12 wet/dry emery cloth,and a little light oil (WD-40). Take your lap and do figure 8's on it with your emery cloth and oil. You will see the high and low spots on your lap. A good cleanup is necessary; use lava soap, an old tooth brush, and lots of hot water.

What you use on the lap is important. I use diamond. If I'm just cutting a stone or doing repair work, I never go above 50,000 mesh. But for competition, you need to use 100,000 or even 200,000 to get a competition quality polish. Essentially there are three types of polishing diamond: The Italdo and Raytech sprays and the pastes. I use all three, depending on what I'm trying to achieve. The Italdo has a wax in it that acts as a lubricant. I'll use that first. The paste serves the same purpose. On a freshly scored lap, I'll use paste just to fill the grooves up. If during the polishing I want more diamond without any more lubricant, then I use the Raytech spray. I use it exclusively when I just want to put more bort on the lap. I think the Raytech spray is much easier to use than loose diamond powder.

I don't know how many times this has to be repeated, but so many people think that if a little diamond goes a long way, a little more diamond will go even farther. Nothing could be further from the truth. Once you spray some diamond on the lap, it's unbelievable howmuch better a finish you'll achieve if you try to wipe as much of that diamond off as you can.

Here's a sceret: When I get a new tin lap, or after I have it machined, I will score it. Then before I prepare it with diamond, I clean the lap with lava soap, first with the lap running in one direction, then reversing the direction for a second cleaning. I turn my water drip on and run the soap across the lap a few times, then slow the water drip down until the lap is almost dry and the soap is almost pulled out of my hand. Rinse well and reverse the lap direction and do it again. Rinse well but do not dry. Next wet a tissue with household vinegar and wipe the lap from hub to outside edge. Don't be afraid to wet it down with the vinegar. Let the lap spin dry at a slow speed.

What am I doing ? I'm oxidizing the surface of the lap. A layer of tin oxide is being formed on the lap. The tin oxide seems to hold the diamond a little better, and the combination works well. I don't recommend you use any other acids. Vinegar is a lot safer.

The application of the diamond on the lap is important. I lightly spray the entire lap and allow the lap to spin for 15 minutes to allow all the solvents to evaporate. With a piece of cromium and a slow speed press the diamond into the lap. Now with a dry tissue wipe off as much of the diamond as possible. I then use the paste. With a little dab

on my finger I coat the outer one inch of the lap. This area is used to more quickly polish in the meet points. As the meet point starts to come together, stop, wipe clean, and finish the polishing on the inner part of the dry lap with a light touch to remove any fine scratches caused by the outer quick-polish area.

How do you achieve a good polish ? There are three ways of doing something: Your way, my way, and the right way. Essentially what I am saying is nine times out of ten what works for you won't work for me. Polishing is a personal thing. You must discover what works for you. But you must know something about the material that you are trying to polish.

One facet may polish quickly with no problems. Turn the the next index on the gear, and now nothing under the sun seems to work. It's because of the different atomic structure of that facet. Either the facet is too soft or too hard. If it's too soft, it means you've got to slow your lap down considerably.

There are so many factors involved with polishing: the amount of pressure you apply, the amount of slurry and its wetness (how much extender or lubricant on the lap), and so on. Each stone is an experiment in itself, because 99% of polishing is the chemistry between the stone, the lap, and the polishing agent.

Here's a final tip: If a facet refuses to polish, sometimes just by cleaning the lap off with a bit of alcohol, by getting some of the scum off the lap, the stone will polish. Again, polishing is a personal thing. The perfect polish takes practice.

Thoughts on Polishing With Diamond

by Fred Van Sant

Most faceters I have talked to agree that the action of diamond in polishing is best when it is a scraping action rather than a tumbling and chipping action. On coarse diamond cutting laps, where the diamond is bonded into the lap surface, you have a scratching **or** a scraping action. When you cut facets with a new 150 grit diamond cutting lap it cuts fast because the points of the tiny embedded diamond particles are sharp; they scratch or tear particles out of your stone. After it has been used for a while the sharp points get worn off, and it doesn't cut as fast but it cuts a smoother surface. The scratching action of the sharp point has changed into a planing action. On a worn lap you have the effect of many tiny planes shaving off bits of your stone. It is reasonable to expect that such comparable actions of the diamond are not changed merely by the size of the diamond particles; a new and worn 1200 diamond lap act the same as the 150. Therefor when we look at the polishing process it seems reasonable to assume the same things are going to happen.

Two important qualities in a polishing lap are hardness and flatness. The lap must have a surface which allows the applied diamond to embed or it must be made with the diamond already embedded, and secondly, it should retain its flatness for a reasonably long time.

If we use a lap so hard that the diamond particles cannot become embedded, then there will be a tumbling and chipping action on our facet's surface. This will not produce as smooth a polish as embedded diamond particles worn down into tiny planes.

Ceramic laps are very flat and retain their flatness for a long time, but they are too hard to allow the diamond particles to embed, and are therefor unsuitable for polishing. Polishing with a ceramic lap is not well understood. The ceramic lap is made of corundum particles cast in a glassy matrix. When new there is only the rolling and chipping action of the diamond. A mixture of diamond, oil, dust, and stone dust builds up on the lap surface--I call this "crud", others call it "slurry". If you wipe all the crud off the lap the diamond goes with it and you have to recharge the lap. With use, the glassy matrix between the corundum wears away. Tiny pockets develop in which the crud collects. The lap is now said to be "broken in". In addition to the diamond particles rolling and chipping on the surface you have diamond particles rolling around in the pocketed crud and a few diamond particles lodged against the back edge of the pockets performing some scraping action. The consistency of the crud and the amount of diamond in it is always changing, making it nearly impossible to predict how your facet will polish. It becomes a constant battle trying to maintain the amount and consistency of the crud and the amount of diamond in it. These problems are further aggravated by the fact that occasionally a particle of corundum will break out of the glassy matrix and roll between the lap and your stone, producing a scratch. Also balling-up (agglomeration) can occur in the crud on the surface and in the pockets. These agglomerates can become larger than the size of your polishing particles, and cause a scratch. You cannot prevent agglomeration because you need the crud to polish with. Any crud on the lap can also cause slight rounding of the facet by turbulance at its leading and trailing edges. Your ceramic lap can be best used for setting hot pots on when cooking or serving meals.

In an **ideal metallic lap** where the diamond

is applied externally, the diamond should embed only under firm pressure. After applying a charge of diamond, a very hard material should be used to force the new diamond into the surface of the lap. The lap should be hard enough so that the lighter pressure used in polishing does not continue to force the embedded diamond down into the lap to where it is even with or below the lap's surface, and where it is ineffective. There are two reasons for the diamond not becoming further embedded under normal polishing: The first is economical. If the diamond sinks into the lap before it has a chance to polish for its useful life, you are wasting it. The second is that if it sinks in before it wears enough to attain a planar surface you never get the planing action, only the scratching action. It must remain embedded but with a part of the particle above the surface so that it can become worn into a plane and perform a planing action. Only then do you get your best polish.

At present I know of no lap that meets the above ideal requirements. I have John Alden's lap which is harder than others, but when new it takes more than one charge of diamond initially, and other applications of diamond at periodic intervals, but not nearly as much as a tin lap does. I think it needs to be a little harder yet. At the ideal hardness, the metallic lap should require very little diamond, hold its flatness and seldom, if ever, need to be resurfaced.

It is not only the diamond that can embed. The softer the lap the more the particles from the stone being cut can embed with the diamond. Most metal laps being used today, such as copper and tin, are too soft, and must be continually recharged until the buildup of embedded particles causes a bridging effect to occur which slows the sinking of the diamond grit into the lap. At this point the tin lap should be at peak performance. With further embedment there is the probability that too much diamond and crud become embedded in proportion to the metal needed to hold it, resulting in incomplete embedment, with subsequent semi-embedded material coming loose and tumbling on the lap. This condition of saturation may be what Charles Hettich refers to when he speaks of a tin lap becoming "cranky", requiring resurfacing. Also with soft laps flatness may be lost too quickly and grooving can occur.

Since it is the embedded diamond, and not the slurry, which we want to do our polishing, the lap's surface should be kept clean and free of crud when polishing. Cleansing of the lap's surface must be continuous.

To reduce heat at the facet's surface, the lap needs a lubricating agent. Either the finest oil or oil-kerosene mixture can be used. Clean, pure water should also work well, and may be the best.

Some people advocate scoring the metal lap. The only reason I can think of for doing so is if you intend to polish with a continuously running source of water and believe the grooves help remove the crud, or if you want to use the slurry in the polishing process and think that the grooves help hold a reservoir of slurry.

If you intend to polish only with the embedded diamond, you must keep the lap surface free of crud to prevent agglomeration and rounding of facet edges. Scored grooves can hold crud and help accumulate agglomerates.

There are also laps which are neither ceramic nor metallic, like the Last Lap. I have not used these, so will have to let others tell about them, but if diamond is used the above principles should apply to them also.

AFMS Rules Revision Update

by Bill Norton, CFMS Representative to AFMS Faceting Rules Revision Comm.

The American Federation of Mineralogical Societies' Faceting Rules Committee, with William Horton as Chairman, has worked very diligently to prepare the proposed updated faceting rules changes for presentation at the AFMS Rules Committee meeting in Cleveland, OH, July 23-26.

Every Federation was represented on the committee. Each committee member submitted ideas from faceters in their Federation, which were in turn sent to all committee members for study and comment. The 6 Federations presented some very divergent suggestions. The comments and recommendations which were returned to Bill Horton were compiled and committee members then voted on their choices, hopefully representing their constituents to the best of their ability. Bill Horton then prepared the proposed rules changes from these ballots.

Majority rules in this democratic process. Not everyone can be pleased with everything. But, hopefully, the final rules changes will be constructive and productive, enticing more faceters into competition. A great deal of time, energy and thought were invested in this project. Bill Horton is to be commended for his persistence, and for his equitable management in completing this effort in a timely fashion.

My personal commentary: All Federations had a chance to submit their proposals and include "pet" philosophies and rules ideas. I submitted many suggestions from responses to my questionnaires, articles and personal contacts.

Some of these had an effect on the final proposals. All rules changes as proposed pertain to case entries.

Remember that any society, guild, etc., can offer competition opportunities in their own shows, with their own rules and awards systems. These competitions do not affect AFMS standings for the competitors.

Offers of special trophies (similar to Facetron and Johansen) may be submitted to the CFMS Executive Committee for consideration for the CFMS Supplementary Rules. This is one opportunity to familiarize CFMS (or perhaps your Federation) competitors with some USACF espoused ideas and rules.

COMING ATTRACTIONS 1992

• Jackpot of Gems, **July 18—19**, at Reno/Sparks Convention Center, 4590 S. Virginia St., Reno, NV

• Combined AFMS/Midwest Federation Show—**July 23—26**, Brunswick High School, Brunswick, Ohio. Send SASE to John Blue, 16155 Shurmer Rd., Strongsville, OH, 44136

• 3rd Annual Midwest Faceters Guild Seminar, **August 14.** For Info write Kathleen Myers, 11630 S. Gera Rd., Birch Run, MI, 48415

• California Federation Show in Hayward, CA, at the Centennial Hall, **August 21-23.**

• Australian Faceters Guild Annual Faceting Seminar, **Sept. 19—20**, see notice on page 3.

• New Zealand Natl. Gem and Mineral Show, **Sept. 25—27**. Write to Jack Houghton, P.O. Box 12—036, Christchurch, New Zealand.

• Reno Gem & Mineral Society Show Convention Center, Reno, Nevada **Sept. 26 & 27.**

• Intermountain Faceters Guild Show Burley, Idaho, **October 30, 31 and November 1.**

• International Faceters Fair and Workshop, **November 7 & 8**, Sacramento, California, at the State Fairgrounds.

COMING ATTRACTIONS 1993

• The Australian Faceters Guild 1993 Gemboree will be at Alice Springs. Write to AFG Secretary, P.O. Box 2965, Alice Springs, NT, 0871 Australia

• The Calgary Faceters Guild will host the 1993 Northwest Federation "International" Faceters Symposium, in Calgary, Alberta, Canada, **May 22-23.** For information write Violette Merkeley, 2823 Canmore Road NW, Calgary, Alberta, Canada T2M 3J7 Phone: (403) 289-4175

To Compute or Not to Compute.

That is the Question. Whether 'tis better to suffer the wrong angles and other errors of outdated or outrageous designs, or to take up a computer against them--to correct and improve--to achieve a more perfect design--'Tis a goal much to be desired. But the costs in money and time must give us pause.

If you do not have a computer and have no other use for one, forget it, unless you can afford rich toys. If you can use one for other purposes then of course you will weigh them all together, but you must still consider the time it takes to learn how to use a program--not only that but you must consider the necessity of using the program regularly enough to keep in practice, so that you feel confident in your ability to avoid making the same sorts of errors that you hope to eliminate. Even if you already own a computer you still have to stay in practice in your use of the design program. It is the same as playing the piano; let it go a while and you forget. If the design needs improving, other skills are needed. You must learn how the various combinations of indexing and angles govern the direction that lines on the plan view run. You must learn to recognize the possible and the impossible, and how to achieve maximum and balanced light reflections. You must be able to picture in your mind the potential problems and the cutting sequence. Many people have difficulty doing these things, and some find it impossible.

(continued on page 13)

From American Gemcutter, #3

California's Vern Johnson Discusses His Special Techniques For Polishing.

[Editors note: This article was done many years ago, but still contains good advice]

Diamond Paste Applied in Pea-Sized Squirts For use as Pre-Polish

(In this premier edition of MASTER GEMCUTTER, California faceter Vern Johnson discussed the cutting techniques that have earned him the undisputed title of the "winningest faceter in U.S. history".

This month, Vern continues his discussion with the emphasis on polishing. His approach to polishing is rather straightforward, but he offers a few wrinkles that elevates the finish on his stones to prize winning status.)

GEMCUTTER: How about a polishing lubricant? What do you prefer?

Johnson: Well, now that differs, depending on how I feel. I use a drop or two of regular diamond extender on occasion, and I also like to use the Italdo spray without the diamond in it.

GEMCUTTER: Perhaps I should have asked first: What techniques do you use for applying diamond ? I'm referring to syringe applied paste, spray-on, as well as powder. Do you use the latter?

JOHNSON: I avoid diamond powder; too much trouble. As for the paste, I use this essentially for pre-polishing. I apply one or two pea-sized squirts on the lap and then smear it around with a finger tip. If it's a bit stiff, I place a little extender on my finger tip, too, and this helps spread it easier and more evenly. I find that one treatment like this will do the entire stone. Too many faceters use too much diamond paste.

GEMCUTTER: And the spray-on type?

JOHNSON: That's really my favorite. I like to finish up a competition stone with 100,000 plus grit, you know--the 1/10 micron. I give my Last Lap one or two good squirts because even this fine diamond can give you scratches if you allow it to dry. The swarf balls up, hardens and fuses, and then moves under a facet and grabs hold, tearing it up.

The old adage: keep your laps moist is a good one...and this applies to all laps.

GEMCUTTER: In commercial cutting, a faceter will wipe a facet off with a finger tip, inspect it, and then re-introduce it to the wheel. In competition cutting, the process is a bit more refined, isn't it?

JOHNSON: Oh, yes. I lift off carefully and clean with a cloth dampened by rubbing alcohol–not wood alcohol because it's toxic. After I've inspected, I place it down on the lap very carefully.

I can't emphasize too much, I don't think, how vital it is for a faceter to develop a soft touch against the laps. It's not damaging to undercut–and so terrible to overcut. That's where a nice, soft touch–one that you constantly practice to maintain--comes in handy. One of a faceter's first goals should be to get his touch under control.

GEMCUTTER: How about your workshop lighting?

JOHNSON: I make certain I have a bulb where you can see the filament itself because this kind of illumination will expose flaws and scratches. I'd advise anyond using a frosted bulb to replace it with a clear bulb, otherwise the light is so soft that scratches disappear on you.

Each time I lift a facet up off the lap I follow the same procedure so I don't overlook anything. I lift, clean with the alcohol dampened cloth or tissue, inspect by moving the light all around to view the facet from a series of angles. Now this means the light should be adjustable too, and when I know exactly what I intend to do next, I re-introduce the facet to the wheel.

GEMCUTTER: How strong is the clear bulb?

JOHNSON: I use a 40W or 60W bulb. This, I believe, would depend on a person's eyes. It's the filament–not the brightness–that exposes the scratches.

Sometimes the lower wattage bulb is easier on your eyes and can still show the scratches. In general, though, I'd have to say that if you're inspecting a stone that you know judges will be examining you're better off with the high intensity incandescent lamp. Those judges not only have good lighting themselves, they have good eyes. You won't get one scratch past them, I'll assure you of that.

GEMCUTTER: Are you a devotee of sunlight for inspecting for scratches?

JOHNSON: Absolutely. There's only one way I know to detect those minute scratches in a fine polish and that's to take it out in the sunlight and roll the stone in all directions, catching the sunlight.

That procedure alone will prove whether or not you have a prize winning polish. I don't care how good the light is inside it can't duplicate the clearness of good sunlight. You can even detect the difference between a polish with 50,000 grit and 100,000 grit.

GEMCUTTER: As a prize winning faceter, Vern, how do you get the points so accurate?

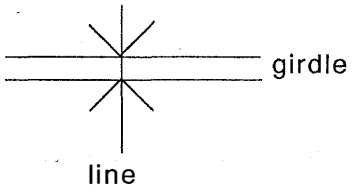
Perhaps your technique would be helpful, not so much for winning prizes, but simply for the average faceter to cut more precisely?

JOHNSON: I follow a rule that a number of other outstanding cutters also use: line up lines–not points. If you line up on the lines, the meet points will take care of themselves. Look down the line, too–not the spaces between the lines–and this holds true even on oblique intersections, and across the girdle.

There's always the problem of parallax when you try to focus in on a point–and by lining up on lines you minimize this tendency.

GEMCUTTER: This rule would be helpful also for lining up crown and pavilion break facets across the girdle, wouldn't it?

JOHNSON: Oh, yes. Let me draw a little diagram here of how the crown and pavilion would appear at one intersection on a round brilliant. Any faceter will immediately recognize what I'm drawing. Perhaps you could reproduce this.



When you're aligning the top to the bottom always look straight into the intersection and anticipate a 90° angle. It's good to occasionally close one eye for sighting (parallax again).

GEMCUTTER: This would work on a standard 2%–or bigger–girdle, wouldn't it?

JOHNSON: As I mentioned before, my own idea of the proper thickness of a girdle is what is pleasing. For competition you absolutely need the 2% girdle, but look at a diamond–some of those girdles are mighty thin.

For commercial stones, girdles understandably are a bit thicker because you need to give the prongs something to grip. Still, though, I don't think a girdle should exceed 3%–5% of the finished stone's height.

GEMCUTTER: How about the table size? Many colored stone faceters exceed the so-called "ideal" measurement of 53%. That's Tolkowsky's diamond standard anyway, right?

JOHNSON: Some diagrams show a 40% table so a variation is perfectly acceptable. Diamond was 51%-53% as the proper size, but European "swindling" influence gradually moved it up to 55%-57%, which is now acceptable.

Whatever size you make the table the objective is to get that rim of fire–and it comes out of the mains and breaks. Reduce these facets in size and you tamper with that desirable optical situation. That's what the real limit to a table size involves-how much fire you are willing to forfeit.

GEMCUTTER: Polishing the table–that's always a fun area for a faceter. Any hints on how you accomplish this toughest of all facets?

JOHNSON: I wish there was a magic rule. If it exists, I haven't learned it. Sometimes I finish a table in five minutes–and again I can spend all day on it.

One thing is certain. If your lap isn't perfectly flat you'll be going back and forth, cheating and cheating. I rather suspect that some of the trouble one encounters in trying to polish a table–or any large facet–can be traced to a polishing lap that perhaps is not perfectly flat.

Let's face it. Polishing the table is hard work. I put the table in before the star facets...

GEMCUTTER: Why? So the stars will point up more precisely?

JOHNSON: That is a benefit, but the major advantage lies in the fact that the stars will cut away the edge-rounding on the table, even if it's very slight.

GEMCUTTER: Based on your comments about a polishing lap's flatness, you must be a devotee of the ceramic lap!

JOHNSON: The ceramic lap is the ultimate in flatness, but in my experience it just won't give you the micro polish that you can get from a tin, lead, or Fast Lap or Last Lap.

A ceramic lap is like polishing brass with steel wool. It leaves scratches. To avoid this condition with a ceramic lap you must build up a boundary layer–glaze a ring section for the final polish–so the facets don't touch the ceramic material itself.

If you doubt what I say, take a ceramic polished stone, one that has actually touched the lap surface, out into the sunlight and inspect the polish carefully. As I've said before, there are no secrets or lies in the sunlight. If you have scratches in the polish, the sunlight will reveal them.

GEMCUTTER: Scoring a lap–what is your opinion on that?

JOHNSON: I don't like scored laps. I say keep a tin lap clean and use it. You have enough of a contamination problem with the dust in the air–quartz, really–so why compound the problem with scoring.

One of the reasons a matrix type lap such as a Last Lap proves so outstanding is the ability to get rid of swarf. If any dust has settled on the lap it can easily be removed with a good flow of water.

GEMCUTTER: Your technique in

polishing? Do you hold the facet in one ring or do you keep the stone moving over the lap?

JOHNSON: I never hold the stone in one spot. I keep it moving back and forth because experience will eventually teach you the feel of the polish leveling out on the stone. You can feel the polish "take" after awhile and only by motion can you get this peculiar feeling in your hands.

GEMCUTTER: How do you keep your laps clean?

JOHNSON: Any good dishwashing soap will clean a lap sufficiently. Lava soap I find is particularly effective.

A Scotch Pad is also fine for removing swarf, and if you turn the machine on and reverse the direction it will really clean up well, knocking off any impaction.

GEMCUTTER: One final question: How do you keep your NuBond laps sharp?

JOHNSON: It's easy if you remember that the diamond particles are all through the resin material of the lap. Any good wet/dry sandpaper moved back and forth from the nut to near the edge while held flat to the surface while the lap is turning will sharpen it up. Keep the sandpaper away from the edges. (end).

To Compute or Not to Compute
(cont'd from page 10)

There is also a creative and artistic side to it all, like composing music or painting. If in your faceting experience you have not already created a few designs on your machine, you will probably not do it on the computer either. If in cutting a design you have not been curious enough to recut the same design with some variations, you will probably not be able to redesign a cut on the computer.

If you are cutting mainly for profit, working with expensive rough, then it may be to your advantage to buy a computer even if design checking is all you want to use it for, since the price of rough and the carat weight of stone saved over time may justify the expense.

I am not saying these things to discourage anyone; there is a great deal of satisfaction in solving design problems, improving old designs, and especially in creating new ones. But one must be realistic. It's not everybody's game. Some are jumping in and publishing designs before they have acquired experience. Designing a cut on the computer does not take less experience than doing it on a faceting machine--it takes more ! On a stone you see the immediate results when you cut a set of facets; on the computer you may have to imagine that set.

(To Compute or not to compute--cont'd.)

It is possible for someone who has never cut a stone to publish a design he has created on the computer. My own computer program will not recognize any index number except whole numbers, but other programs may do so. Designs may appear having index numbers such as 4.2 and 13.6, and the design may produce a beautiful stone, but who is going to cut it when so many other good designs are available which do not require cheating ? If it were not for the necessity of restricting indexing to integer numbers, then designs could probably be produced with ordinary commercial CAD programs.

Having given some of the warnings, what are the advantages ? Let me count the ways: 1) You can check designs before cutting to make sure all angles are correct, making minor corrections if necessary. 2) You can translate angles for different materials. 3) You can change the L/W of a design to fit your preform. 4) You can add in or delete sets of facets in existing designs. 5) You can change the size and shape of facets in existing designs to suit your own preferences, change the table size, eliminate problem spots. 6) You can compute the CAM preform for existing designs, the Cone angle for the CAM preform, offsets for arc sections, volume, and the 3-dimensional lengths for every line on your stone in relation to the stone width.

The variations in changes you can make range all the way from minor angle corrections to a complete new design. You remove the guesswork from the cutting process. You know before starting to cut that the design is correct and will work. That in itself brings a great comfort of mind.

-- by Fred W. Van Sant --

THANK YOU'S

To Chrystalite for the laps.
To Jim Ball for the donation of rough material.
To Creative Gems from Seagoville, TX for rough material and their support and sponsorship.

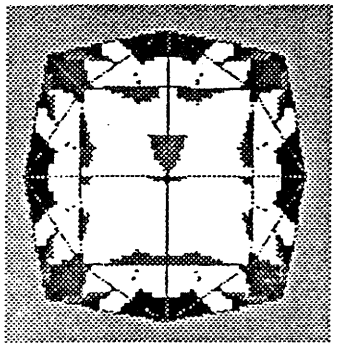
The chance of a piece of bread falling with the buttered side down is directly proportional to the cost of the carpet.

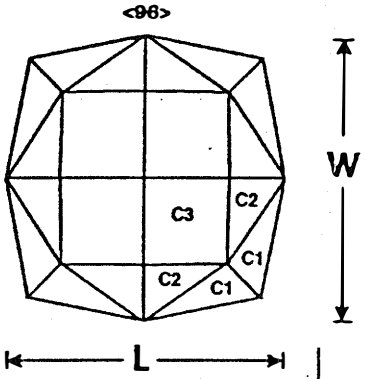
Everything east of the San Andreas fault will eventually plunge into the Atlantic Ocean.

NAME	COUNTRY	1	2	3	4	TOTAL
DON HENSON	AUST	95.15	97.81	97.18	98.90	389.04
JACK TUFFLEY	AUST	97.76	97.53	96.77	96.63	388.69
RON HARDMAN	AUST	97.76	98.01	95.08	96.97	387.82
VIC KOSTIC	AUST	95.24	97.50	95.51	99.08	387.33
CHAS HETTICH	USA	97.51	94.44	97.61	96.59	386.15
NORM COATES	AUST	97.67	96.19	95.20	96.83	385.89
GLENN KLEIN	USA	96 56	96.45	94.10	97.77	384.68
JOHN DARBY	AUST	97.66	95.36	96.52	95.34	384.88
JOHN ALDEN	USA	96.63	94.94	95.17	95.98	382.72
FRANK DICKSON	AUST	96.13	94.31	95.46	96.74	382.64
DES STENNETT	AUST	95.33	93.11	94.93	96.72	380.09
DON DUNN	USA	93.72	92.67	95.50	97.43	379.32
PAUL BILLETT	USA	93.51	93.04	92.78	94.89	374.22
HUBERT RACKETS	USA	92.23	91.31	96.83	92.50	372.87
BOB GIBSON	AUST	93.59	92.94	90.71	93.88	371.12
JIM BALL	USA	90.79	89.23	92.69	92.45	365.16
EARNEST THAXTON Jnr	USA	91.06	84.61	91.96	90.42	358.05
WALT CARSS	USA	91.10	86.54	92.06	86.50	356.20
EVAN WILLIAMS	AUST	88.14	87.82	89.58	86.15	351.69
DEREK ATKINS	UK	83.42	87.20	89.59	80.67	340.88
PHILIP GRIMM	USA	89.81	83.13	82.16	78.67	333.77
JEAN MARR	USA	75.81	86.43	83.63	84.86	330.73
ROSS CLARK	CAN	84.42	85.89	87.59	70.86	328.76
DUANE LUCE	USA	70.53	88.93	85.02	82.43	326.91
P G van ZANTEN	NED	84.56	77.15	82.49	75.88	320.08
TOM DRAWDY	USA	73.13	82.29	80.98	80.10	316.50
HOWARD GERBER	USA	82.21	76.16	81.00	74.79	314.16
THEO van HULSEN	NED	73.45	80.90	78.18	74.80	307.33
GLEN GODDEN	CAN	69.24	70.96	77.73	73.67	291.60
CRAIG McGREGOR	NZ	74.11	73.23	67.20	60.97	275.51
RON SCOTT	NZ	61.51	71.88	70.87	67.72	271.98
ROBERT STEPP	USA	65.10	65.96	69.85	64.19	265.12
MILTON HOUSTON	USA	65.28	64.22	63.08	49.75	242.33
JAMES HOUSAGO	UK	54.94	47.78	60.59	57.04	220.35
HERMAN van SCHUUR	NED	66.01	69.28	63.18	N/E	198.47

SEATTLE FACETOR DESIGN October 1991

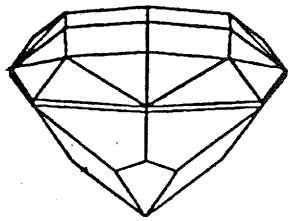
BRIGHTNESS DIAGRAM Design 15.021

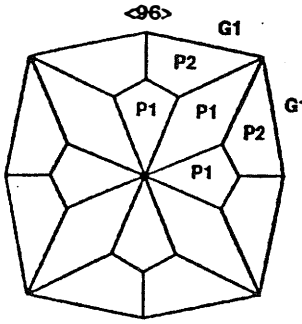




SPOT Lighting
Table Brt=88 · Avg Brt=71
Based on RI=1.54 (Quartz) at 99%Trans

15.021 OLD MINE CHECKER





For a perfectly square table, cut C3 at 7.92°.
C/W will be .1799
For CAM Preform, cut 8 facets at 39.31°, using girdle indexing. Maximum cone angle for the CAM Preform is 34.2°.
This is a good cut for small stones. --- FVS

15.021 OLD MINE CHECKER

96 index	L/W = 1.000	36 + 8 = 44 Facets
P/W = 0.513	C/W = 0.173	H/W = 0.705
P/H = 0.727	C/H = 0.245	Vol./W^3 = 0.265

Angles for R.I. = 1.54 (Quartz)

Reference: New Design by Norman Steele

This design is an "Apex facet" version of the "Old Mine" shape (also an ECED design). It has the typical small dark spot in the very center of the crown, but Table brightness is still a respectable 92 in Quartz.

Pavilion cutting order is extremely flexible- - - it makes little difference whether P1 or P2 or G1 is actually cut first.

PAVILION and GIRDLE CUTTING INSTRUCTIONS

Step/Angle		Bearing Index	Comment
P1	41.0	96-12-24-36-48-60-72-84	Cut to PCP
G1	90.0	3-21-27-41-51-69-75-93	Fix size and girdle
P2	54.0	3-21-27-45-51-69-75-93	Level girdle

CROWN CUTTING INSTRUCTIONS

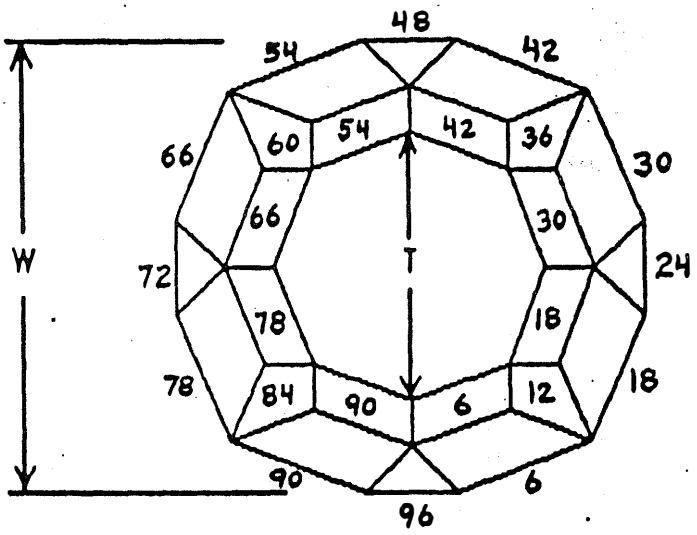
Step/Angle		Bearing Index	Comment
C1	41.0	3-21-27-45-51-69-75-93	Match pavilion girdle
C2	37.0	2-22-26-46-50-70-74-94	Meet C1-girdle
C3	7.0	12-36-60-84	Meet C1-C2

Novice-10
96 Index Gear
Angles for Corundum

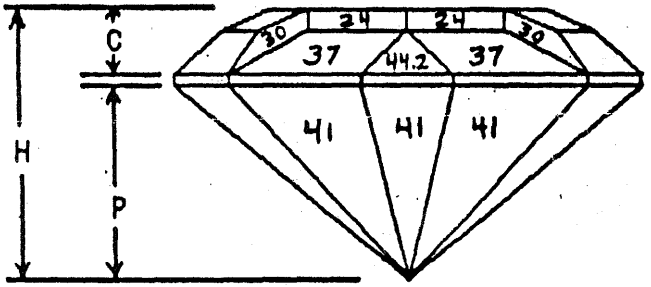
Crown:
1. 4 at 44.17° 96,24,48,72.
2. 8 at 37.00° 6,18,30,42,54,66,78,90.
3. 8 at 24.00° 6,18,30,42,54,66,78,90.
4. 4 at 30.00° 12,36,60,84.

Table Area = 29.6 %
T/W = .5833
C/W = .1643
P/W = .4346
H/W = .6189

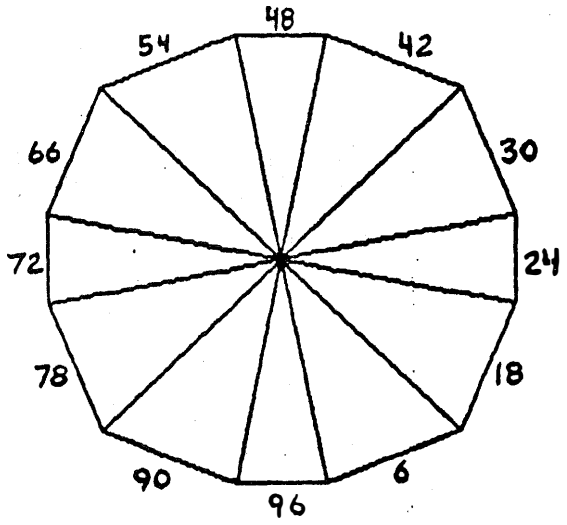
Crown: With mast set for 44.17° at index 96 to start, cut all girdle break facets to make an even line around stone without changing mast height. Then cut set 2 at 37°. The peak of the small triangle facet at 96 marks the line between the two steps. Cut set 4 last.



Cutting Angles in Degrees →



Preform:
This is an ECED Design. Cut girdle facets at 90 degrees on girdle indices at single mast height setting.

Pavilion:
1. 12 at 41.00° 96,6,18,24,30,42, 48,54,66,72,78,90.

Designed by Fred W. Van Sant